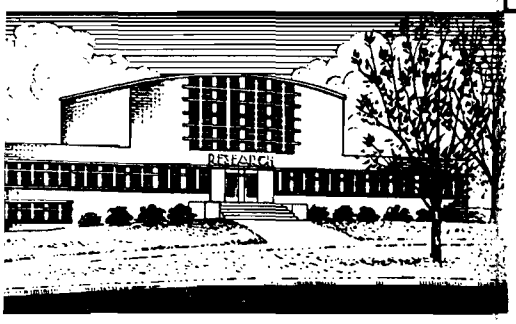
Project B-166-2

Potential Wood-Using Industries For Georgia

Prepared for
The Georgia Department of Commerce
Abit Massey, Director

by
Tze I. Chiang



Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia

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100 State Capitol
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July 1959

Table of Contents

Appendix

Tables, Figures, and Maps

Figures

Maps

Foreword

The second of a series on opportunities for developing new industrial payrolls in Georgia's smaller communities, this report covers several potentials which exist for many counties in the State which up to this time have not shared in the industrialization occurring at a steady pace. Woodpulp, furniture, hardboard, insulation board, wood prefabricated houses and wood pallets are all evaluated.

Because of the problems posed by the extensive small forest holdings and the relatively inefficient uses of timber which usually accompany such holdings, discussion of wood cottage industries and forest product cooperatives concludes the report. Because of their suitability to many of our less populated areas where timber resources exist, and because of the potentials they offer the development of new payrolls in communities which at present may have relatively few attractions for firms coming in from outside the State, these two potentials deserve close attention.

Additional potentials in the wood products field will be the subject of later reports in the series. Wood briquettes and wood flour are two such products presently being analyzed.

Interested local groups are invited to contact the Industrial Development Branch or the Department of Commerce regarding any assistance they may need in applying the findings of this study to their particular circumstances. Comments and suggestions regarding both content and approach are welcome.

Kenneth C. Wagner, Head
Industrial Development Branch

Acknowledgments

The writer is indebted to Mr. William H. Sardo, Jr., Executive Vice President, National Wooden Pallet Manufacturers Association, for providing the production figures for the wooden pallet industry.

Credit is due to Dr. Walter P. Kennon, Industrial Development Branch, for the use of materials gained from interviews dealing with the furniture industry in Georgia.

Credit is acknowledged to Dr. Kenneth C. Wagner, Dr. Ernst W. Swanson, and Mr. Robert Bullock, Industrial Development Branch, who kindly reviewed the preliminary report. Their comments and suggestions were most helpful and deeply appreciated.

Summary

Since Georgia is one of the leading forest states, special attention is drawn in this study to wood utilization. Six wood-using industries were selected for study on the basis of their large-scale demand in the past, expected expansion in the future, and their adaptability to Georgia's expanding economy. The industrial trends of woodpulp, wood furniture, hardboard, insulation board, prefabricated houses, and wood pallets were determined and the feasibility of their expansion or manufacture in Georgia was analyzed.

Woodpulp production in Georgia increased from 1,091,708 tons in 1950 to 2,362,000 tons--about 10 per cent of the nation's total--in 1958. By 1965, it is expected to reach 3,762,000 tons. Nine additional pulpmills, each with a daily capacity of 500 tons, are needed to produce this expansion. The enormous pulpwood reserves and the increasing number of pulpwood trees in Georgia indicate an assured supply of wood raw material for future needs.

In the furniture field, Georgia emerged in 1957 as the fifth important state in the South. Georgia's share of the national furniture output value was roughly two per cent, which was reasonably in line with its population and personal income percentages. However, many opportunities exist, due to the fact that a considerable quantity of high quality furniture was imported to the state each year. With the advantages in raw materials, the sales should exceed this amount.

Hardboard manufacture has been one of the fastest growing U. S. wood industries for the last two decades. Production increased six times and consumption increased over seven times from 1939 to 1958. Consequently, about 10 per cent of the U. S. consumption in 1958 was imported. Georgia has no hardboard plant at present but has an abundant wood raw material supply for hardboard manufacturing.

The production of insulation board has grown with an average yearly increase of 3.6 per cent since 1941. Based on the projected trend line, production may reach 3.5 billion square feet in 1965, a 20 per cent increase over 1958. Georgia has one insulation board plant, and probably needs more to meet growing population and construction.

Prefabricated houses accounted for 3.2 per cent of all single-family houses built in 1947 and 6.2 per cent in 1958 in the United States.

Applying assembly-line production methods for prefabs cuts down building costs drastically. It has been predicted that 90 per cent of all houses built in the next 20 years will be prefabricated. Georgia has at present only two prefabbers.

Pallet production has a high correlation with the total industrial output in the United States. It is expected that pallet production will increase along with total industrial output. By 1970, pallet production may more than double the 1958 figure. Georgia's share was estimated at 1.5 per cent in 1957.

Small forest holdings in Georgia cause many inefficient uses of forest resources and part-time employment in various tree-farm areas. Two suggestions, wood cottage industries and forest product cooperatives are made in the hope of attacking the problems of small holdings. Various small wood industries adapted to home markets may provide many job opportunities for rural areas. Cooperative organization of small forest holdings on a county level could bring about a centralized management-and-utilization arrangement that would improve cutting practices and bring better returns to members.

INTRODUCTION

Georgia is the leading state in forest acreage east of the Mississippi River and second only to Oregon in total commercial forest area. Annual growth in both pine and hardwood exceeds annual cut according to recent studies. With these superior positions in forest resources, Georgia leads the South in harvest of sawtimber and leads the nation in the production of naval stores. In pulpwood production, Georgia leads the South and is second only to the State of Washington. Moreover, one-half of Georgia's 6,000 manufacturing plants are dependent on forests for their raw materials.

Since forests are such an important resource of the state, special attention to utilization is needed. Two new trends in utilization of timber emerged before and after World War II. They are the manufacture of synthetic boards based on wood and integrated operations of woodworking industries. These trends have grown stronger in recent years. Unfortunately, Georgia is lacking, or behind, on both counts. Synthetic boards such as hardboard, particle board and insulation board are gradually replacing lumber and plywood in various end-uses. Integrated operation, which could bring about a fuller utilization of forest resources and better management of woodland, is generally considered as a matter of large-scale enterprise. Due to dominant small forest ownerships in the state, it is important for Georgia to find ways and means to accomplish this purpose in many forest areas.

A. Purpose and Scope of the Study

Since the end of World War II, the continuing growth in manufacturing in Georgia coincided with the gradually transforming economic base from agriculture to industry in the southern states. The surplus farm labor in this transformation must be re-employed in industry. The wood-using industries are the major segment of manufacturing in Georgia. Logically, these wood-using industries should be in position to absorb a portion of surplus labor from farms. In order to attain this purpose, the wood-using industries in Georgia should be expanded where possible. New industry should be brought in where Georgia has the demand and needed raw material. The great diversity of wood-using industries presents different aspects in economic life. This study assesses them separately and spotlights the industries and products that appear to have the greatest potentials. Expanding the growth-products and industries will inevitably provide employment opportunities and income to many communities in the state.

Woodpulp, wood furniture, hardboard, insulation board, prefabricated houses, and wood pallets were selected for study[1/] on the basis of their large-scale demand in the past, expected expansion in future, and their adaptability to Georgia. In general, the purpose of this study is to gather production, consumption, and other pertinent economic data in order to focus on and to establish an industrial trend which will be of vital interest to large numbers of investors and business executives in the wood-using industries. However, this study provides only some indication of the position and possible development of the products or industries listed above. A detailed study of costs, return on investment, market potential, competition, plant location, and regional situation on each product or industry should follow where such necessity is requested to the Industrial Development Branch by any segment of wood-using industries or other interested concerns.

The last section of this report deals with small ownership of tree farms in the state. Small ownerships tend to create inefficient management of forest land and part-time employment. Two counter-measures, wood cottage industries and forest products cooperatives, are proposed in the hope of attacking problems accrued from smallness of forest ownerships and farms.

B. Methods of Procedure

Three steps have been taken in this study: (1) growth products or industries which could be manufactured in Georgia have been determined, (2) economic data has been collected on each of these products or industries, and (3) data have been analyzed and results presented.

Based on the data published in the Census of Manufacturers, 1947 and 1954, various wood products and industries were screened on the basis of employment gains and value added during this period. Carload Waybill Statistics published by the Interstate Commerce Commission were used to shed light on the deficit products in Georgia. Moreover, four periodicals dealing with wood-using industries covering a period of the last 15 years, have been searched to uncover new products which may not appear in the Census of Manufacturers or in the Carload Waybill Statistics. The growth products based on the first screen were narrowed down to six by checking wood raw material supply and through a general knowledge of the market situation in Georgia.

1/ Industrial Development Branch has published separate reports on particle board, charcoal briquettes, and paperboard containers.

Economic data collected for this study were procured from various sources: government and non-government statistical publications, bulletins, articles, and correspondence with the related institutions. Several interviews with local furniture stores and building material dealers were made to secure a feeling for local situations. Various small wood products mentioned in the last section of this report were derived largely from the literature.

Tabulation and statistical methods have been applied in preparing tables and graphs. Forecasts on the future demand of products were based upon their past trends or correlation with other factors. Analysis also was made on the merit of economic considerations.

I. WOODPULP

Historically, the pulp, paper and board industry has a record of fast growth. The demand for paper and board products implies an average rate of increase of 3.4 per cent per year over the period 1955 to 1965.[1/] This generates the great demand for woodpulp which is the prime raw material for paper and board manufacture.

The production of wood pulp in the United States and Georgia over 15 years is presented in Table 1. The figures from 1950 to 1957 are from actual production. The Georgia production had a high correlation with the U. S. production throughout the past period. The U. S. production from 1958 to 1965 was projected by the Committee on Interstate and Foreign Commerce based upon real disposable income, gross national product, and industrial production. The Georgia production in 1958 was estimated according to the capacity of 7,620 daily tons of 11 pulpmills in Georgia. The Georgia production in 1960 and 1965 was projected by correlation with the U. S. figures.

If the past trend of production is continued, Georgia's production of woodpulp will reach 3,762,000 tons by 1965. This growth is likely to take place if the national economy and the world situation are kept within the present "normal" condition. By 1965, Georgia will need an additional 4,510 daily tons of pulpmill capacity to take care of 1,399,800 tons of net increase over 1958. In other words, nine additional pulpmills each with daily capacity of 500 tons, or 4.5 additional pulpmills each with daily capacity of 1,000 tons, will be needed by 1965.[2/]

The growth of woodpulp production will naturally require a greater supply of pulpwood. The pulp production in Georgia has relied almost exclusively on local pulpwood resources. Southern pine has constituted about 95 per cent of the pulpwood supply, with the remaining 5 per cent supplied by hardwoods.

Pulpwood supply by 1965 will have to be 60 per cent above the 1958 level in order to meet the expanding pulp production. The ratio between woodpulp production per ton and cords of pulpwood consumption was 1.656 in

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1/ Pulp, Paper, and Board Supply-Demand, Committee in Interstate and Foreign Commerce, Union Calender No. 198, 1957.

2/ See maps in the Appendix for possible pulpmill sites in Georgia.

Table 1

Woodpulp Production in the United States and Georgia, 1950-58, 1960 and 1965

Year	United States (tons)	Georgia (tons)	Percentage of U. S. Production
1950	14,848,951	1,091,708	7.35
1951	16,524,408	1,209,445	7.31
1952	16,472,979	1,227,057	7.44
1953	17,537,297	1,372,386	7.82
1954	18,256,000	1,573,458	8.62
1955	20,739,696	2,027,599	9.77
1956	22,130,949	2,138,995	9.66
1957	21,800,209	2,192,108	10.05
1958	23,944,000	2,362,200	9.865
1960	26,179,000	2,791,000	10.661
1965	32,383,000	3,762,000	11.617

Sources:
(1) 1950-57 U. S. and Georgia: Facts for Industry
(2) 1958, 1960 and 1965, U. S.: Projected by Interstate and Foreign Commerce.
(3) 1958, 1960 and 1965, Georgia: Estimated and projected by the Industrial Development Branch

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Georgia, which was comparable to the national ratio of 1.627[1/]. Table 2 indicates the quantity of pulpwood required to support pulp production in Georgia from 1954 to 1965.

1/ Pulp, Paper, and Board Supply-Demand, op. cit., p. 116.

Table 2

Woodpulp Production and Pulpwood Consumption in Georgia
1954, 1958, 1960 and 1965

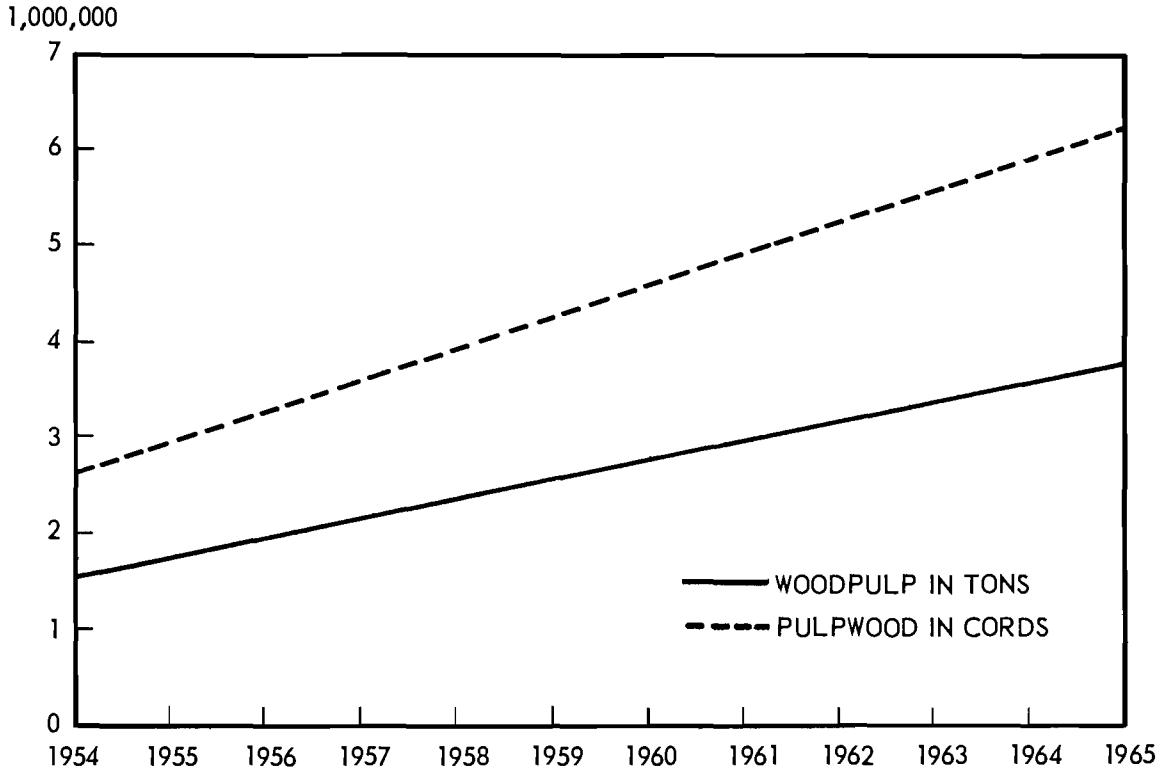
Year	Woodpulp Production (tons)	Pulpwood Consumption (cords)	Ratio
1954	1,573,458	2,605,726	1.656
1958	2,362,200	3,911,472	1.656
1960	2,791,000	4,621,896	1.656
1965	3,762,000	6,229,872	1.656

Sources: 1954 - Census of Manufacturers

1958-65 estimated by the Industrial Development Branch

Figure 1

Trends of Woodpulp Production and Pulpwood Consumption in Georgia, 1954-1956



SOURCE: Table 2

Although the demand for pulpwood in Georgia is increasing rapidly year after year, the enormous pulpwood reserves and the increasing pulpwood trees in Georgia indicate an assured supply for future needs. Several pertinent facts regarding pulpwood resources in Georgia follow:

1. Georgia has enormous pulpwood resources.

Table 3

Net Volume of Growing Stock,[a/] Pulping Species in Georgia
(in standard cords)

Yellow Pine	Other Softwood	Soft-hard Wood	Hardwood	All Species
101,112,000	6,323,000	36,497,000	30,543,000	174,485,000

a/ 5 inches or more.

Source: Forest Statistics for Georgia, 1951-53, Southeastern Forest Experiment Station, Forest Survey Release No. 44, November, 1954.

2. Georgia sound trees in pulp sizes (6" to 8") are increasing.

Table 4

Number of Sound Trees in Pulp Sizes, Georgia
(in millions)

	Pines			Hardwoods		
Diameter	1935	1953	Per Cent Change	1935	1953	Per Cent Change
6"	311	441	+42	204	241	+18
8"	217	277	+28	114	142	+25

Source: Georgia Trees, The Georgia Forestry Commission, Forest Survey Report No. 44.

3. Number of small-size trees are increasing while large-size trees are decreasing; thus the lumber supply would be tightened but the pulpwood supply increased.

Table 5

Number of Sound Trees in Percentage Change by Diameter, Georgia, 1935 to 1953

Diameter of trees	2"	4"	6"	8"	10"	12"	14"	16"	18"	20"
Pines % change	+47	+55	+42	+28	+24	+ 5	-18	-33	-50	-70
Hardwoods % change	+64	+51	+18	+25	+34	+16	+13	-11	- 9	-33

Source: Georgia Trees, The Georgia Forestry Commission Forest Survey Report, No. 44.

4. Hardwoods are increasingly used for pulp production due to the development of new pulping methods. The amount of hardwoods harvested for pulping almost doubled from 1951 to 1955 in Georgia. The hardwood resources which are suitable for pulping are in tremendous reserve in Georgia.

The existing supplies of standing timber in Georgia, plus prospective growth, appear adequate to supply the demand for pulp production for the next few decades. However, the decrease of large-size trees in Georgia will cause further tight supply of timber for other uses. Because of the competitive strength of the pulp and paper industry, production of pulpwood can be expanded at the expense of other wood-using industries. Pulp mills can use low-grade timber, thinnings and plant residues and can compete for small timber before it reaches an economic size for lumber. It seems likely that the main impacts of timber shortages fall upon industries producing lumber or other products requiring higher quality and large-size timber.

Subsidiary Table 1

Pulp Mills in Georgia 1958

	Tons/day
Brunswick Pulp and Paper Company, Brunswick	525
Owens-Illinois Glass Company, Valdosta	650
Rayonier, Incorporated, Jesup	650
Georgia Kraft Company, Macon	675
Rome Kraft Company, Rome	675
St. Marys Kraft Corporation, St. Marys	500
Certainteed Products Corporation, Savannah	60
Ruberoid Company, Savannah	60
Southern Paperboard Corporation, Savannah	625
Union Bag-Camp Paper Corporation, Savannah	3,000
Armstrong Cork Company, Macon	200
Total	7,620

II. WOOD FURNITURE

Furniture may be defined as decorative and utilitarian furnishings, usually restricted to movable articles, for homes, churches, public and private buildings. The Census of Manufacturers lists three main groups of furniture: household furniture, office furniture, and public-building and professional furniture.[1/] The first group represented approximately 79 per cent; the second, 12 per cent, and the third, 9 per cent of the total annual value added by furniture manufacture in the United States in 1957.[2/] This report emphasizes the growth of the wood furniture industry and its opportunity in Georgia.

The growth of furniture manufacture is generally associated with increased personal income and population. The rapid growth of furniture manufacture in the South largely took place in North Carolina and Virginia in the last two decades. However, Georgia emerged as the fifth important state in 1957 for furniture manufacture in the South.[3/] The percentage of growth in the last 10 years indicated either by the aggregate value of output or by the amount of employment places Georgia ahead of the national and southern averages (see Tables 6 and 7). This trend is likely to continue if the furniture industry in Georgia is willing to accept the challenge for economic growth.

Table 6

Output Value of Furniture Manufacture and
Its Percentage Changes Between 1939-49 and 1948-57

	1939	1948	1957	Percentage Changes 1939-48	1948-57
	(million dollars)				
Georgia	20	48	87	+140	+83
South[a/]	251	845	1,333	+237	+58
United States	944	2,900[b/]	4,614	+207	+59

a/ Includes Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

b/ 1949 figure.

1/ Excluded fixtures and miscellaneous here.

2/ Annual Survey of Manufacturers, 1957.

3/ Manufacturers Record, May, 1958, P. 18 (tables).

Table 7

Persons Engaged in Furniture Manufacture
in 1948 and 1957

	1948	1957	Percentage Change 1948-57
	(1,000)		
Georgia	6	8	+33
South[a/]	103	128	+24
United States	393[b/]	384	-2

a/ Includes Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

b/ 1949 figure.

Sources: Manufacturers' Record and Blue Book of Southern Progress.

The status of wood as furniture material is challenged by metal and other materials, although wood is still the major source. From 1947 to 1957 the aggregate added value of wood household furniture was almost doubled, but its relative percentage in all household furniture declined from 73 to 70 per cent. The decline of wood as furniture material is the most obvious in office furniture. In the same period, wood office furniture increased about 30 per cent in value added by the manufacture, but its relative percentage in all office furnitures declined from 25 to 14 per cent (see details in Subsidiary Table 2).

Leaders in furniture manufacturing have expressed the following opinions on requirements to maintain or expand wood as a dominant source for furniture fabrication:

1. Need for more attractively designed furniture to replace their obsolete pieces.

2. Need for a trade-in program to meet a modern-day economic problem.

3. Need for using more veneered construction in order to preserve scarce, fine woods.

4. Need for more intensive market research.

In 1957, Georgia's share of the national furniture output value was roughly 2 per cent, which was reasonably in line with its population and personal income percentages.[1/] However, many opportunities exist for further

1/ See Subsidiary Table 3.

development. Every year, Georgia imports a considerable quantity of high quality bedroom furniture from other states. Transportation of furniture is a tiresome and expensive matter because it is bulky and requires great care in handling. Although one big furniture manufacturing firm considered locating a factory in Georgia in recent years, a major plant has not been established in the state.

A large scale furniture plant in Georgia would logically serve the southeastern market (Georgia, Alabama, Florida, South Carolina, and Tennessee). Most of these states are net importers of high quality furniture from North Carolina and other states. Including North Carolina in the southeastern region, the furniture output value of this area was 639 million dollars in 1956 and 707 million dollars in 1958--roughly 15 per cent of the nation's total.[1/] North Carolina alone accounted for 50 to 60 per cent of the total furniture output value in this region. Taking 70 per cent of this output value as household furniture, a household furniture plant in Georgia would operate in a market with an annual sales potential of 400 to 500 million dollars. The growth potential of all manufacturing in this region was estimated at 90 per cent from 1956 to 1965 and 156 per cent from 1956 to 1970.[2/] If household furniture growth can keep pace with the average manufacturing growth in the southeastern region, its market potential will reach 849 million dollars by 1965 and 1.144 billion dollars by 1970.

Public building furniture has marked a rapid growth in the last decade. Wooden school chairs, benches and stools recorded a 673 per cent increase in value of shipment from 1947 to 1957.[3/] With the rapid expansion of educational systems apparently assured, continued growth of wood furniture in this field is expected. The development of public furniture manufacture in Georgia has only taken place in the past 10 years. Four establishments employed 100 to 249 persons in 1954.[4/] Special attention, it seems, is needed for further development.

1/ Manufacturers' Record, June 1957, June 1958.

2/ According to unpublished estimates made by the Industrial Development Branch during the course of a feasibility analysis of a petroleum refinery for Brunswick, Georgia.

3/ Growth Industries in Wood Products and Furniture, Industry Trend Series No. 6, U. S. Department of Commerce.

4/ Ibid.

Wood raw material, skilled labor, and designing are the major consideration for furniture manufacture. Georgia has good quality oaks and gums. Yellow poplar, soft maple, and cypress are also available. Mahogany, walnut, and cherry--which have wide appeal--can be imported for veneering purposes. Skilled labor could be trained locally or brought in from out of state. Designing need not be done locally, although the possibility certainly exists that local talents could be utilized effectively.[1/]

1/ See maps in the Appendix for possible furniture plant sites in Georgia.

Subsidiary Table 2

Manufacturing Value Added by Household Furniture
and Office Furniture, 1947-1957

	Household[a/]	Wood Household[b/]	Wood Household in Percentage of Household	Office[c/]	Wood Office	Wood Office in Percentage of Office
	($1,000)			($1,000)		
1947	933,467	685,168	73	107,711	26,835	25
1949	950,033	--	--	103,696	19,902	19
1950	1,173,578	846,701	72	116,999	21,499	18
1951	1,241,382	885,043	71	164,809	32,208	20
1952	1,311,622	909,936	69	182,980	27,491	15
1953	1,391,084	1,004,963	72	157,650	22,040	14
1954	1,320,743	905,748	69	154,566	28,757	19
1955	1,493,734	1,035,958	69	192,015	32,549	17
1956	1,598,723	1,122,072	70	241,858	37,561	15
1957	1,604,000	1,116,000	70	242,000	35,000	14

a/ Includes wood household furniture, reed and rattan furniture, metal household furniture, mattresses and bedsprings, household furniture not elsewhere classified.

b/ Includes not upholstered and upholstered.

c/ Includes wood and metal office furniture.

Source: Annual Survey of Manufacturers, 1947-57.

Subsidiary Table 3

Personal Income, Population, and Furniture Output Value, United States and Georgia, 1957

	Personal Income[a/] (billion dollars)	Population[b/] (million)	Furniture[c/] Output Value (million dollars)
United States	345,272	170.333	4,614
Georgia	5,407	3.779	87
Georgia in per cent of U. S.	1.6	2.2	1.9

a/ Survey of Current Business, U. S. Department of Commerce.

b/ Chemical Economics Handbook, April, 1958

c/ Manufacturers' Record, May, 1958

III. HARDBOARD

Fibreboard with a range in density from 50 to 75 pounds per cubic foot has for years been known in the industry as "hardboard." However, the Bureau of Census and other government agencies classify fibreboards with density above 24 pounds or 26 pounds per cubic foot as hardboard.

Fibreboard is a sheet material manufactured from fibres of wood or other cellulosic fibre materials with natural adhesive properties bonded together by heat. Some bonding agents or other materials may be added during manufacture in order to increase strength or other properties.

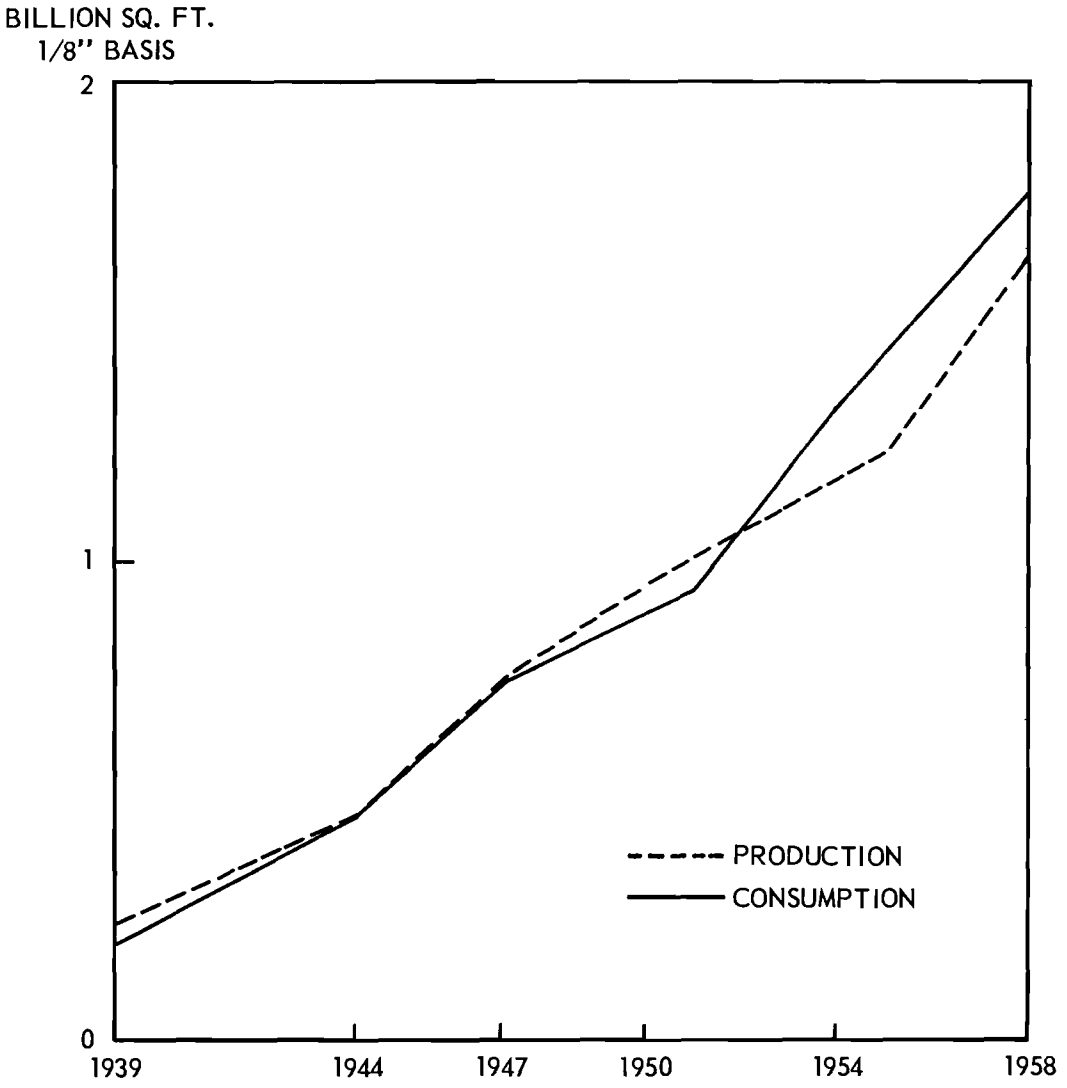
Hardboard is made in several types and various thicknesses and sizes. There are two basic types of hardboard--"screenback" (rough one side) and smooth on both sides. Each of these two types is made in treated (or tempered) and untreated (or untempered) grades. The treated grade is treated with oil blends after pressing to make it stronger and more water resistant. The untreated screenback board is generally regarded as standard grade.

Hardboard has been called a product of 1,001 uses. It is used in construction, furniture and fixture manufacture, industrial manufacture, household applications, and in various other uses. Hardboard, insulation board, plywood and other building boards are used both in construction and for industrial purposes. These materials are distributed through the same marketing channels with different degrees of competition for a market share.

Hardboard manufacture can be regarded as one of the fastest growing segments of the U. S. woodworking industry in the last two decades. Production increased six times and consumption increased over seven times from 1939 to 1958. Judging from the growth pattern (see Figure 2 and Table 8), one may agree that this product still is in its prime life of growth.

Figure 2

United States Hardboard Production and Consumption, 1939-58



Source: Table 8.

Table 8

United States Hardboard Production, Imports, Exports, and Apparent Consumption, 1939-58

Year	Production	Imports[a/]	Exports[a/]	Apparent Consumption
	(thousand of square feet--1/8" thick basis)			
1939	232,474	N.A.	16,000	216,474
1944	471,411	N.A.	N.A.	471,411
1947	758,236	N.A.	12,072	746,164
1950	950,899	14,750	20,180	945,469
1951	956,801	55,755	22,003	990,553
1952	1,067,262	47,653	21,301	1,093,614
1953	1,165,866	73,625	15,802	1,213,689
1954	1,267,004	69,026	14,164	1,321,866
1955	1,481,083	109,834	17,541	1,573,376
1956	1,496,778	155,620	18,642	1,633,756
1957	1,555,888	168,092	18,496	1,705,484
1958	1,636,038	158,894	17,115	1,777,817

a/ 1939-57 included fibreboards with 24 pounds per cubic foot; 1958 included fibreboards with 26 pounds per cubic foot.

N.A. Not available

Source: 1939-53: Hardboard, United States Tariff Commission, Washington, D. C., 1955.

1954-58 production: Facts For Industries.

1954-58 imports and exports: Converted from United States Imports of Merchandise For Consumption and United States Exports of Domestic and Foreign Merchandise, U. S. Bureau of Census.

U. S. hardboard production, imports, exports, and consumption from 1939 to 1958 are presented in Table 8. Consumption exceeded production about 10 per cent in recent years. Imports, which were almost 10 times as large as exports, made up the gap between production and consumption. Exports of hardboard accounted for over 6 per cent of production in 1939 but dwindled to only 1 per cent of production in 1958. The imports came largely from Sweden and Canada.

The Stanford Research Institute has projected the U. S. demand for hardboard to 1975. According to this projection, hardboard demand in 1975 will be three times as large as in 1952. (See Table 9.) Comparing the consumption figure in 1958 (1,778 million sq. ft.) with the Stanford Research Institute's projected demand in 1960 (1,600 million sq. ft.), the projection tends to underestimate future growth. However, it serves to indicate a broad outlook for hardboard in different uses. Hardboard will be increasingly used in construction, both residential and non-residential, because of its relatively low cost and adaptability to many uses. Hardboard will also be used in furniture, industrial, and household application to an increasing extent.

Table 9

Hardboard Demand in the United States, 1952-75
(millions of square feet--1/8" basis)

Year	Construction	Furniture	Manufacturing	Household	Total
1952	220	325	280	175	1,000
1960	530	430	400	240	1,600
1965	770	530	460	270	2,030
1970	1,000	650	570	330	2,550
1975	1,280	780	630	360	3,050

Source: America's Demand For Wood 1929-1975, Stanford Research Institute.

The market distribution of hardboard can be indicated by shipments to different geographical areas. According to the United States Tariff Commission's statistics for 1953, about 39 per cent of the domestic shipments of hardboard went to the North Central states, 25 per cent to New England and Middle Atlantic states, 15 per cent to Southern states, 13 per cent to combined Rocky Mountain and Plains states, and 8 per cent to Pacific Coast states. (See Map 1.)

MAP 1
MARKET DISTRIBUTION OF HARDBOARD IN THE UNITED STATES, 1953

The production of hardboard in the United States is largely concentrated in Mississippi and Pacific Coastal states. Masonite Corporation, with its patented processing method, produces about 50 per cent of the nation's supply. However, several new processing methods were developed in recent years and many new plants are in production today. About 17 to 20 plants are in production but none of them is in Georgia. (See Map 2.) There certainly is room for further development here. Distribution of new plants will tend to disperse throughout the nation according to market demand and availability of wood raw material supply.

Due to a large variety of uses and well established markets, the market potential of hardboard in different places can be broadly indicated by local population. The U. S. annual per capita consumption of hardboard in 1958 was 10.3 square feet. Thus, Georgia's market potential is estimated at 39,550,000 square feet for 1958.

Round wood and wood residue are both used in hardboard production. Where round wood is used, it is usually in the form of low-grade saw logs, stand-improvement cutting, and species of relatively little value as saw timber. Hardwoods are predominately used. Where wood residues are used, the supply must be reliable and the pieces must be large enough to permit chipping. Sawdust, shavings, or other small scraps are generally not suitable for hardboard production.

The ever increasing low-grade hardwoods and cull trees in Georgia's forest land create a serious problem for replanting more useful species. The utilization of Georgia's low-grade hardwoods and cull trees for hardboard production not only will provide new revenue to the state but also will create new areas for pine replantation.[1/]

Capital investment for a new hardboard plant is influenced by various factors such as the method of processing, plant size, location, degree of merchanization, etc. According to the survey made by the Oregon Forest Product Laboratory, the investment costs for existing hardboard plants are:

Wet process $20,000-$30,000 per ton[2/] of daily capacity
Dry process $10,000-$20,000 per ton[2/] of daily capacity

1/ See maps in the Appendix for possible hardboard-plant sites in Georgia.

2/ Per ton of hardboard approximately equals 2,500 square feet on 1/8 inch basis.

MAP 2

HARDBOARD AND HARD-PRESSED PARTICLE BOARD PLANTS AND THEIR RAW MATERIALS, 1958

SOURCE: *Forest Product Journal*, Vol. IX, No. 2

IV. INSULATION BOARD

Insulation board is one kind of fibre board, having a density of less than 26 pounds per cubic foot. The manufacturing methods are the same as hardboard, which has a higher density.

Insulation boards are usually manufactured in thickness between 3/8 inch and 1 inch. When greater thickness is required, two or more thickness may be laminated. Stock widths are about 4 feet and lengths vary by type and use with the maximum around 16 feet.

The board is used in housing construction for interior walls, roof insulation, sheathing between framing and outside finish, and is manufactured in special forms for many other uses. It is also used as core material for doors, partitions, and structural decking. A small quantity of low-density insulation board which has vibration capacity is used for industrial cushioning.

The production of insulation board increased from 1.670 billion square feet in 1941 to 2.790 billion square feet in 1958 (see Figure 3 and Subsidiary Table 4). Although the actual production fluctuated year after year, the trend of production was upward with an average increase of 3.6 per cent per year. Since insulation board is used primarily for housing and construction, the trend of growth in production is likely to continue. According to various statistics, housing and construction are expected to increase as the population and economy of the nation grow. Based on the projected trend line, the production of insulation board may reach 3.500 billion square feet in 1956, a 20 per cent increase over 1958. The trend line in Figure 3 presents only a long-term outlook rather than actual production on year-to-year basis.

The plant capacity of insulation board has been increasing successively during the past (see Subsidiary Table 5). The capacity was 1.848 billion square feet in 1941 and rose to 3.105 billion square feet in 1953. The trend is still upward.

There are 33 insulation board plants in operation in the United States (Map 3). Most of them have expanded their facilities recently or expect to expand in the next few years.[1/] There is one in Georgia and there are seven

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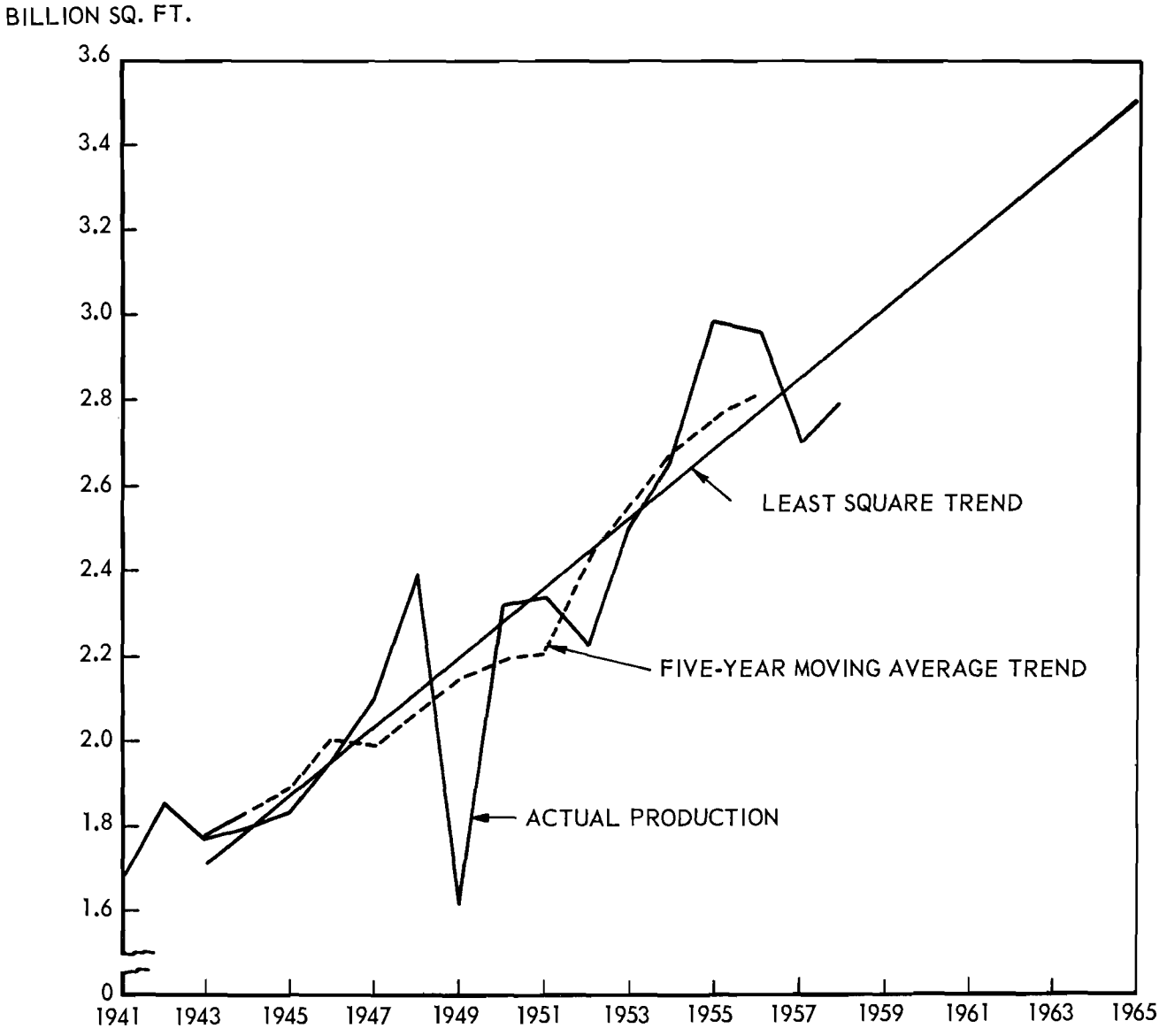
1/ Forest Products Journal, "1958 Status of the Composition Board Industry," Vol. IX, No. 2.

Figure 3

Insulation Board Production and
Trends in the United States



SOURCE: Subsidiary Table 4

MAP 3
INSULATION BOARD MANUFACTURERS AND RAW MATERIALS, 1958

SOURCE: *Forest Products Journal*, Vol. IX, No. 2

in the southeastern states. Viewing the long-term growing demand, it seems that some could be located in the middle and southern part of Georgia where there are tremendous soft-hardwood reserves on forest land.[1/]

The U. S. Forest Products Laboratory has had success in developing the processing of wood waste, low grade lumber, and cull trees into insulation board. Among the existing insulation board plants, only four use wood residues as raw material. Two use wastepaper, two bagasee, two mixed raw material, and 13 use pulpwoods (see Map 3). Wood residues have not become an important supply of raw material for insulation board production because most of the existing plants are located in areas where the supply is not sufficient. Currently, hardwoods of medium and low density are the dominant raw material used.

The trend of the market demand for various types of insulation board can be indicated by a comparison of the amounts of each produced to the total production for all boards. A comparison of production between 1951 and 1957 is presented in Subsidiary Table 6. The result of this comparison shows that roof insulation, insulation roof deck, sheathing board, and form board gained in both quantity and percentage. Acoustical tile and panel tile had gains in quantity only.

Since insulation boards are used largely for construction, its demand in different areas may be indicated by the percentage of local construction activity to the U. S. total. Georgia's share of this total is approximately 1.5 per cent. Georgia's market is estimated at 41,850,000 square feet in 1958.

An insulation board plant with an annual capacity of 25,000 tons[2/] in three shift basis required an investment of about 31.40 million dollars in 1957-1958.

1/ See maps in the Appendix for possible insulation board plant sites in Georgia.

2/ Per ton of insulation board approximately equals 800 square feet on the basis of one inch thickness and 25 pounds per cubic foot.

Subsidiary Table 4

Insulation Board Production and
Trends in the United States

Year	Actual Production[a/] (in billion sq. ft.)	Five-Year Moving Average (in billion sq. ft.)	Least-Square Trend Based Upon Five-Year Moving Average[b/] (in billion sq. ft.)
1941	1.670		
1942	1.849		
1943	1.776	1.783	1.708
1944	1.789	1.838	1.790
1945	1.826	1.889	1.872
1946	1.952	2.011	1.954
1947	2.100	1.973	2.036
1948	2.387	2.072	2.118
1949	1.602	2.150	2.200
1950	2.321	2.190	2.282
1951	2.341	2.212	2.364
1952	2.297	2.438	2.446
1953	2.500	2.556	2.528
1954	2.650	2.682	2.610
1955	2.990	2.760	2.692
1956	2.973	2.818	2.774
1957	2.687		2.856
1958	2.790		2.938
1960			3.101
1965			3.511

a/ Facts For Industries

b/ Y = 1,708 + 81.97 X, Year of origin 1943.

Subsidiary Table 5

Production and Capacity of Insulation Board, 1941-53

Year	Production (billion sq. ft.)	Capacity (billion sq. ft.)	Production as a Percentage of Capacity (per cent)
1941	1.670	1.848	90.4
1942	1.849	1.898	97.4
1943	1.776	1.898	93.6
1944	1.789	1.944	92.0
1945	1.826	1.942	94.0
1946	1.952	1.901	102.7
1947	2.100	2.387	88.0
1948	2.387	2.669	89.4
1949	1.602	2.887	55.5
1950	2.321	3.076	75.5
1951	2.383	3.060	77.9
1952	2.242	3.105	72.2
1953	2.428	3.105	78.2

Source: Paper Trade Journal, Vol. 139, No. 51, December 19, 1955.

Subsidiary Table 6

Insulation Board Production by Types,
U. S., 1951 and 1957

Insulating board, density 26 lbs. or less for cu. ft.	1957 1,000 Sq. Ft. 1/2" Basis	1957 % of Total	1951 1,000 Sq. Ft. 1/2" Basis	1951 % of Total	% Changes
Total	2,687,326	100.0	2,341,100	100.0	0
Building board, natural	140,404	5.2	294,532	12.6	-7.4
Lath for plaster base	545	.0002	41,399	1.8	-1.9
Roof insulation board	579,711	21.6			
Insulating roof deck slab	72,350	2.7	213,209	9.1	+15.2
Insulating fiberboard formboard	29,438	1.1	--	--	--
Interior board, factory finished	807,690	30.1	879,614	37.6	-7.5
Board	134,249	5.0	368,237	15.7	-10.7
Panel and tile	351,445	13.1			
Acoustical tile	294,725	11.0	451,927	19.3	-5.2
Other	27,271	1.0	5,945	.002	+0.9
Sheathing board	627,507	23.4	450,352	19.2	+4.2
Insulating side base	223,570	8.3	277,055	11.8	-3.5
Shinglebacker	58,802	2.2			
Thinboard (7/8" or less)	65,119	2.4	92,172	3.9	-0.7
Other insulating board	82,190	3.1	92,767	4.0	-0.9

Source: Facts For Industries

V. WOOD PREFABRICATED HOUSES

Prefabricated houses are made up of components--walls, partitions, floors, ceilings, and roofs--which are factory-fabricated in forms of panels or sections and shipped to be erected in permanent sites.

After World War II, wood prefabs emerged as an important business and expanded rapidly. Statistics on prefab production are fragmentary and are not consistently reported. The most reliable statistics on wood prefabs can be found in the 1947 and 1954 Censuses and in a survey conducted by the Business and Defense Service Administration in 1957. From 1947 to 1954, the production of wood prefabs increased 130 per cent. When construction activity was down about 20 per cent from 1955 to 1957, wood prefab production was not affected, indicating that prefabbers have been less vulnerable in economic recession than conventional builders.

Prefabs accounted for 3.2 per cent of all single-family houses built in 1947 and for 6.2 per cent for 1957 (see Table 10 and Figure 4). In 1955, the President of National Homes[1/] made a bold prediction that 90 per cent of all houses built in the next 20 years would be prefabricated.[2/] The reasons for prefab growth are given by the industry as follows:

(1) Building costs are cut considerably by applying assembly-line production methods which provide speedy construction, less dependence on weather, lower overhead, faster turnover of capital, etc. The greatest saving item is labor cost. According to National Homes, conventional construction for the average house takes 600 man hours, whereas prefabs require 70 man hours in the factory and only 80 more on the building site.

(2) Prefab producers are eager to use standard equipment and new building materials which bring about a better way of combining and erecting.

(3) Major prefab models are the result of intensive work by top architects in the nation. These models give a better appearance and adaptability for living.

(4) Growing acceptance of prefabs by more consumers.

1/ The largest prefab producer in the United States accounted for 25 per cent of the total sale of prefabs in 1958.

2/ "Problems of Utilizing Wood in Prefab," Forest Products Journal, Vol. V, No. 6, December, 1955.

Table 10

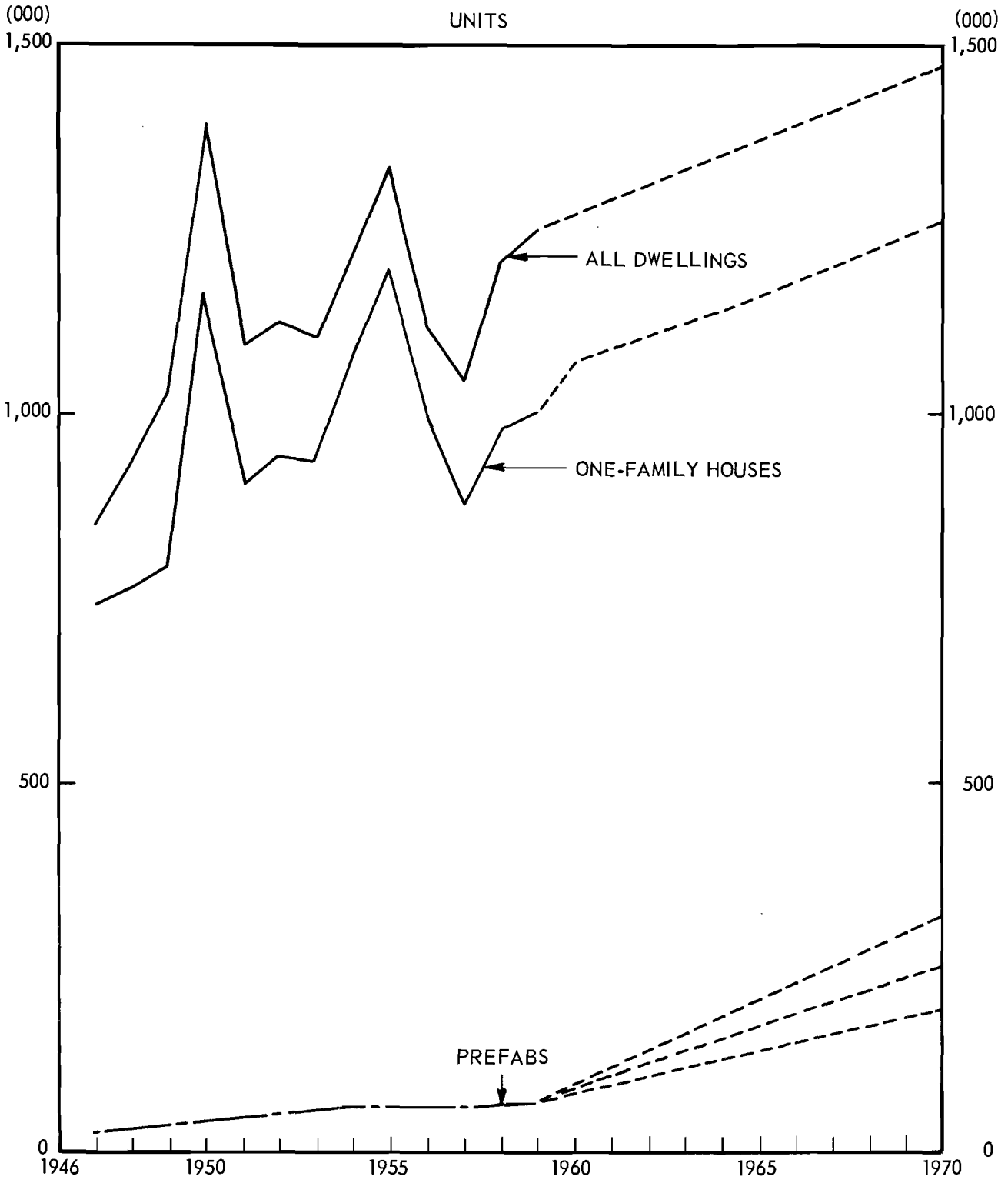
Prefabricated-House Production and New Non-Farm Dwelling Units Started, 1947-1970

Year	Dwelling Units Started		Prefabricated Wood Dwelling Shipments	Ratio of Prefabs to One-family Starts
	Total	One-family Units		
	Number of Units			Per Cent
1947	849,000	740,200	24,140	3.3
1948	931,600	766,600	N.A.	N.A.
1949	1,025,100	794,300	N.A.	N.A.
1950	1,396,000	1,154,100	N.A.	N.A.
1951	1,091,300	900,100	N.A.	N.A.
1952	1,127,000	942,500	N.A.	N.A.
1953	1,103,800	937,800	N.A.	N.A.
1954	1,220,400	1,077,900	57,700	5.4
1955	1,328,900	1,194,400	N.A.	N.A.
1956	1,118,100	989,700	N.A.	N.A.
1957	1,041,900	872,700	57,800	6.6
1958	1,209,400	975,100	61,000	6.2
1959	1,250,000	1,000,000	64,000	6.4
1960	1,268,000	1,070,000	--	--
1965	1,367,000	1,156,000	--	--
1970	1,466,000	1,257,000	(188,550 (250,000 (314,250	15.0 20.0 25.0

Sources: 1947-1959, Construction Review, Vol. 5, No. 6, June, 1959.
1960-1970, Projected by the Industrial Development Branch.

Figure 4

Prefab Production and New Non-Farm
Dwelling Units Started, 1947-1970



SOURCE: Table 10

The production of prefabs is projected to 1970 based upon the possible 15, 20, and 25 per cent penetrations of one-family dwelling units in 1970. The total new non-farm dwelling units are projected based upon a past 13-year trend. The one-family houses are projected upon the correlation with the total new non-farm dwelling units. (See Table 10 and Figure 4 for the details.)

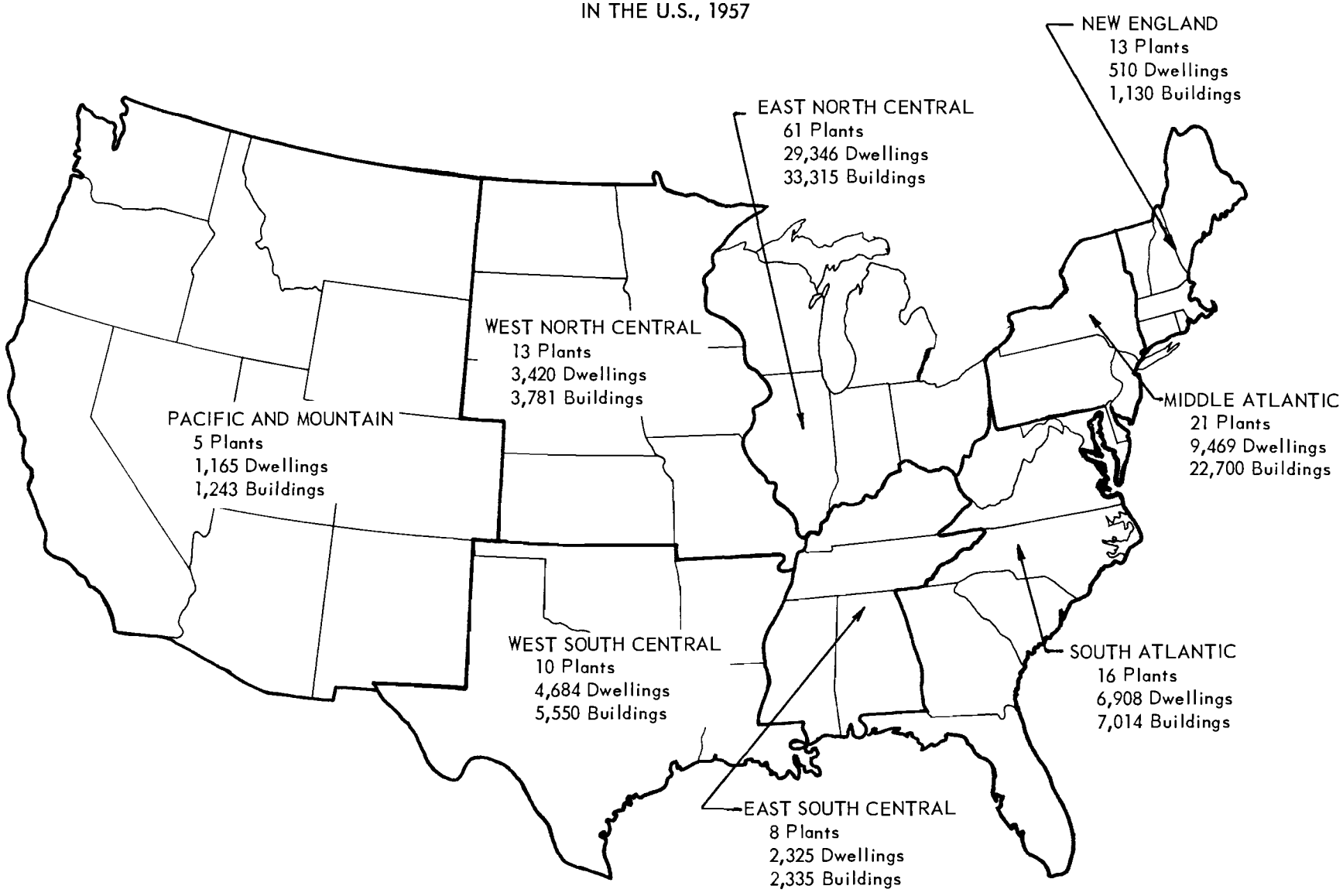
According to the 1957 survey, 163 plants operated by 157 companies were reported in the nation. Among the 163 plants, 133 were prefab producers, 16 produced "pre-cut" materials, and 14 engaged in both prefab and pre-cut fabricatings. The major distinction between prefab and pre-cut is that prefab producers deliver all of the major wood components of a house whose design is under the control of a prefabber.

The geographic distribution of the 147 prefabbers and their output of dwellings and buildings is presented on Map 4. The number of buildings on the map includes dwellings as well as separate garages, farm buildings, and utility structures. The East North Central area accounted for more than half of prefab dwellings produced in 1957, followed by the Middle Atlantic, South Atlantic, West North Central, New England, West South Central, East South Central, and Pacific Mountain districts. Map 5 indicates the location of about 100 of the larger prefabbers in the nation.

The size of prefabbers ranges from an output of a few units to over 10,000 units annually. In 1957, 30 manufacturers produced over 73 per cent of prefab dwelling units, with the remaining 27 per cent made by 117 others. Plant investment varied from a large conveyorized factory to fairly simple woodworking shops. Most plants worked one shift of eight to nine hours, five days per week. If the total plant capacity is estimated on a three-shift basis, more than 200,000 dwelling units could be produced in 1957.

Marketing of prefabs generally involves a two-stage transaction. Producers sell dwelling units in the form of panels or sections to the dealer-erector as a complete package. The package offered by producers represents about 25 to 40 per cent of the value of the completed houses, which is paid by the ultimate consumer. The dealer-erector has to ship the purchased panels or sections to the building site for erection. Interior and exterior finish, roofing and trim, heating and plumbing, electrical units and accessories have to be installed for a completed house which is ready for resale to consumers. In 1957 the average price paid by consumers for a one-story prefab with three

MAP 4
NUMBER OF PREFABRICATED WOOD DWELLINGS AND BUILDINGS PRODUCED
IN THE U.S., 1957



MAP 5
PREFABRICATED-HOUSE PRODUCERS IN THE UNITED STATES, 1957

bedrooms and 1,000 square feet of living space on a concrete floor was $12,000, excluding land but including all fees. According to trade information, 300 to 350 miles radius from a plant is the economic marketing distance.

Wood and wood products such as plywood and fibreboards are the largest items used in prefab production. However, the introduction of Viking homes (with an aluminum exterior wall and roof) by National Homes as its 1959 model and intensive effort of the U. S. Steel Corporation to develop a steel home indicate a stiff competition ahead between wood and other materials. It seems that lumbermen need to take steps to cooperate with prefab producers in order to assure the future status of wood in prefabs.

There are two prefabbers in Georgia--Knox Corporation in Thomson and Yetter Homes, Inc. in Savannah. Single-family housing starts in Georgia are estimated at 20,000 units annually. The wood prefab-sales potential in Georgia should be 1,200 to 1,400 units, estimated on the ratio of 6 to 7 per cent penetration of single-family houses started in 1958.

The constant entry of new producers into the industry and the expansion of existing ones in recent years[1/] indicate that this is a profitable opportunity for further development. Prefab plants will be dispersed throughout the areas of denser population and new plants will tend to be medium sized without excessive investment. The southern and southwestern part of Georgia may be especially suitable areas for this purpose.[2/]

1/ About 26 per cent of all prefabbers were building new plants in 1957 (according to House and Home, December issue, 1957).

2/ See maps in the Appendix for possible prefab plant sites.

VI. WOOD PALLETS

Pallets are low, portable wooden platforms used to facilitate handling, storage, and transportation of materials as a unit. They are generally used in combination with fork-lift trucks to speed up movement of materials and goods and to create the "cubic concept" of modern warehousing. It has been estimated that palletizing results in a 40 to 45 per cent savings in labor and handling costs.[1/]

Pallets are used in ship, truck, railroad, warehouse and intra-plant movement of raw materials and manufactured products. In recent years, pallets have gradually penetrated a new field of application. New-design pallets are used in handling fruit from orchards to trucks, packing plants, and canneries. Handling of grain was also reported as a use for pallets.

As early as the '20's, pallets were manufactured and used on a very limited scale. During World War II, the pallet system was greatly developed by the huge demand of war material movements. It was reported that the various branches of the armed services used between 55 and 60 million pallets between 1941 and 1945. The highest record for military use was 30 million units in 1945.

The demand for pallets declined for a short while during the post-war period but rose again after 1950. The output of pallets, which in 1950 was 23 million units, reached nearly 50 million units in 1956. The great demand for palletization in the post-war period was largely due to the acceptance of the pallet system for commercial and industrial uses and to the rearmament program. The improvement of specifications and standardization of pallets also contributed to the expansion of pallet uses.

Since pallets are used largely for transportation and storage of industrial materials and finished goods, their production is highly correlated to the index of total industrial production. (See Table 11 and Figure 5.) Although the index of total industrial production has declined slightly since 1956 (as did pallet production), it is expected to resume an upward trend in the near future. The index of industrial production was projected to 1970 based on its past 13 years' trend (1946-1958). The production of pallets was also projected to 1970 based on the correlation with the index of industrial

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1/ "Pallet Fastest Growing Users of Lumber," Southern Lumbermen, Vol. 191, No. 2393, December, 1955.

production. If the trend of pallet production remains unchanged and its correlation with industrial production stays the same, the output of pallets in 1970 will more than double the 1958 figures.

Table 11

The U. S. Pallet Production, Lumber Consumed, and Industrial Production Index, 1950-58, 1960, 1965 and 1970

Year	Pallet Production[a/] No. of Units (000)	Lumber Consumed[b/] (board feet) (000)	Index of Total[c/] Industrial Production (1947-49 = 100)
1950	23,000	575,000	112
1951	27,000	675,000	120
1952	33,000	825,000	124
1953	40,000	1,000,000	134
1954	36,000	900,000	125
1955	43,200	1,080,000	139
1956	49,700	1,242,500	143
1957	46,718	1,167,950	143
1958	44,382	1,109,550	134
1960	59,000	1,475,000	156
1965	77,000	1,925,000	178
1970	95,000	2,375,000	200

a/ Obtained through the National Wooden Pallet Manufacturers Association, Washington, D. C.

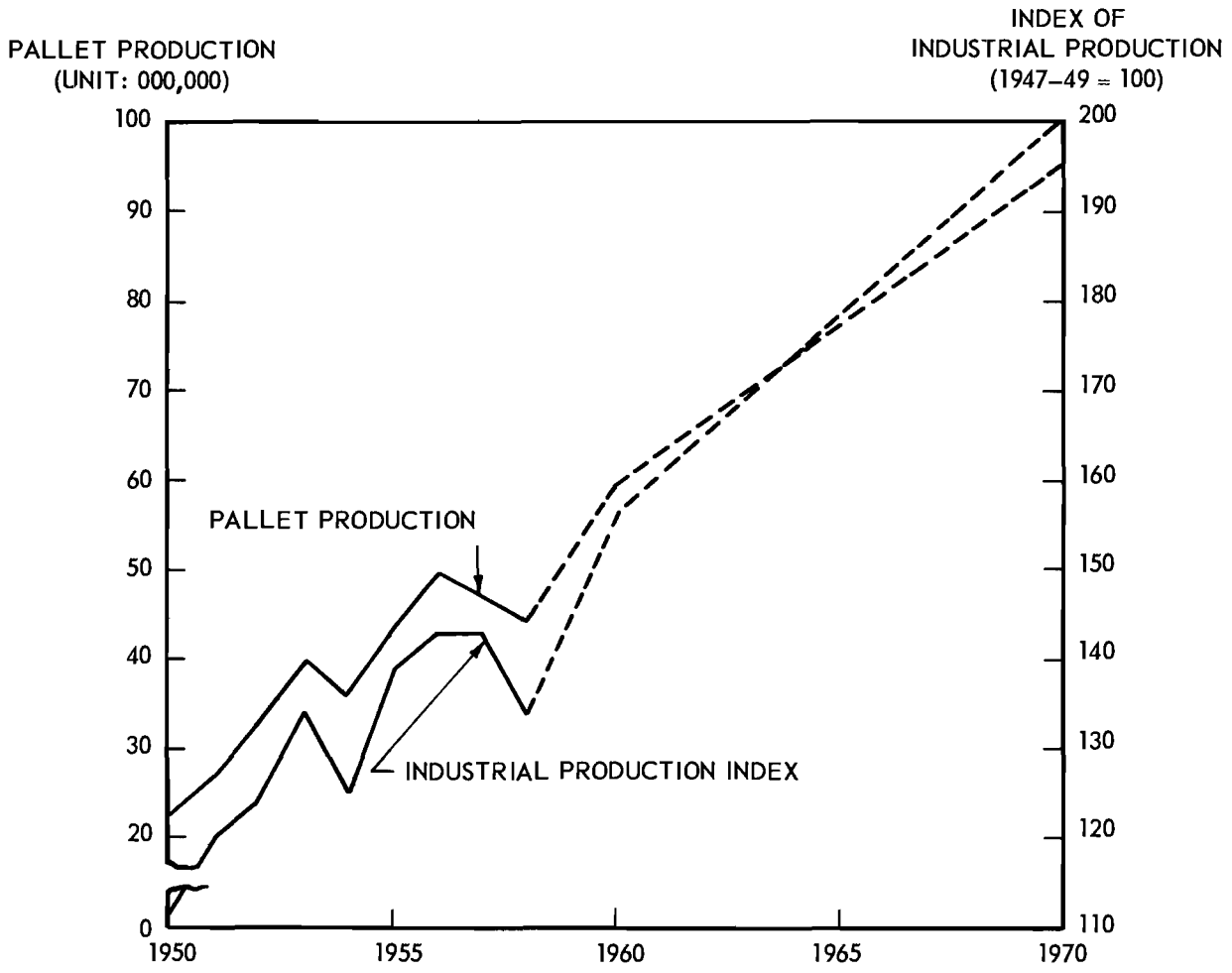
b/ Estimate based on the conversion factor given by the NWPMA, that one unit of pallet requires 25 board feet of lumber on the average.

c/ Economic Indicators, U. S. Government Printing Office, Washington, D. C.

1960-1970 projected by the Industrial Development Branch.

Figure 5

U. S. Pallet Production and Index of Industrial Production, 1950-1970



Source: Table 11.

According to Wood Used in Manufacture, 1948, U. S. Forest Service, the North Central states accounted for 37 per cent of pallet consumption, the northeastern states 36 per cent, the South 16 per cent, and the rest of the nation 11 per cent. The center of commercial pallet manufacture in 1948 was in the Northeast (especially New York), with the South second and the North Central states equal to the Pacific Coast.

The growth of the pallet industry increased the demand of lumber for its manufacture. Since 1955, this industry has been consuming more than one billion board feet of lumber annually. It is expected to exceed two billion board feet by 1970. (See Table 11.) About three-fourths of the pallets were made of hardwoods and one-fourth of softwoods. Pallet manufacture is one important outlet for low-grade and short-length hardwoods which may not be useful otherwise. Oak, gum, beech, aspen, maple, and birch are the major species for making pallets. Southern yellow pine is being used also. Other materials such as steel, wire, aluminum, fiberboard and plywood account for a very small percentage of all pallets made.

There is no accurate census of pallet plants in the nation. It was reported that 300 concerns were specializing in pallet manufacture and twice that many were part-time manufacturers in 1950. Pallet plants vary in size from one-or-two-man operation to factories employing 75 men or more. Most of these concerns produced other wood products as well as pallets. Generally, a radius of 200 miles around a pallet plant is an adequate distance for marketing. However, some large producers shipped distances over 1,000 miles.

The pallet industry, due to easy entry, has already passed the "demand-exceeds-supply" period of wartime. In recent years, keen competition and small profit margins caused many manufacturers to discontinue pallet production. However, demand for pallets will increase as the index of industrial production goes upward.

Georgia has an abundant supply of oak and gum for pallet manufacturing. Only six known manufacturers are in the state. Georgia's market potential for pallets can be estimated by the state's share of the nation's manufacturing. In 1957, Georgia's manufacturing was 1.54 per cent of the nation's. (See Table 12.) An estimated 719,000 units were used in Georgia that year. By 1970, Georgia may need 1,463,000 pallets for industrial uses if the manufacturing ratio is kept constant.[1/] Georgia's ever increasing share of national manufacturing since 1939 may give the pallet industry an optimistic market outlook.[2/]

1/ The ratio is not likely to remain constant. Georgia's share of national manufacturing is likely to increase in the future.

2/ See Maps in the Appendix for possible pallet plant sites.

Table 12

Manufacturing Value of the United States and Georgia, 1939-1957

Year	United States (in million dollars)	Georgia	Georgia as a Percentage of U. S.
1939	56,843	677	1.19
1947	182,445	2,465	1.35
1954	262,273	3,905	1.49
1957	324,022	4,983	1.54

Source: Manufacturers' Record, May, 1958.

VII. WOOD COTTAGE INDUSTRIES AND FOREST PRODUCTS COOPERATIVES

Small farm holdings appear to be out of place in the midst of rapidly expanding mechanization on agricultural land and enlarged farm units. Small holdings and seasonal characteristics of farm work put many farmers on a partial employment basis in various rural areas. Small holdings also prevent effective uses of modern farm management methods and advanced techniques for agricultural purposes. Small holdings therefore tend to result in poverty and declining population to many farm areas and forest lands.

Unfortunately, farm and forest land holdings are predominantly small in the southeastern states and Georgia. In Georgia, over 50 per cent of forest ownership is in farm woodland; 74 per cent of forest ownership is under 100 acres. Part-time employment and inefficient management of small farms and forest land cause the flight of population from rural areas to cities. Much ink has been consumed in arguing for maintaining these small farms amidst the pressure from transforming socio-economic patterns. Nevertheless, any proposal or suggestion which could increase efficiency in managing small farms or provide job opportunities for part-time farmers will promote a better balanced rural economy and could preserve much of the population in rural areas.

In the hope of attacking the problems of part-time employment and inefficiency of small holdings of farms and forest land, two suggestions are made here: wood cottage industries and forest product cooperatives.

A. Wood Cottage Industries

Wood products which are not suitable for large-scale factory production may provide many job opportunities to rural areas which have adequate wood supply. Eight groups of wood products of such nature are listed below.[1/] Specifications, machine tools, and capital requirements in manufacturing of each product or group of products are obtainable by request from the Forest Products Laboratory, U. S. Forest Service, Madison 5, Wisconsin.

(1) Inexpensive wood-paneling materials for home builders and "do-it-yourself" buyers. Panels with clear or knotty nature in different wood species could sell through direct sales channels. Small producers could select suitable materials from mill-run lumber with relatively cheap out-of-pocket cost.

1/ Small Wood Industry-Home Markets, Forest Product Laboratory, Forest Service, U. S. Department of Agriculture, Madison 5, Wisconsin, Report No. 1968, 1953.

(2) Siding panels with new designs in contrast to conventional types of siding. These panels can be made from low-grade and short-length lumber. Without additional sheathings, these siding panels are designed to shed moisture and are suitable for external construction.

(3) Home improvement items. Many houses have been built for minimum essentials in recent years. Additional items such as window shutters, sun shields, flooring, trellises, flower boxes, and work benches can be added for better living. (The Forest Products Laboratory has developed a kind of wood flooring suitable for small manufacturing.)

(4) Outdoor furniture. Metal has gradually replaced wood as the dominant raw material for outdoor furniture in recent years. Some modern-design wood furniture used in lawns and gardens still are welcomed by many people, however.

(5) Ornamental wood fencing. In many areas, ornamental wood fencing is an essential part of garden design. Low-grade wood could be used for manufacture and easy assembly should be considered.

(6) Hog and brooder houses and other farm structures. These structures offer a generally recognized opportunity for small-scale manufacture and local markets. State agricultural engineering departments could be consulted for design and construction details.

(7) Packaged fuel specialties. Seasonal hardwood attractively packaged and displayed might be salable-like charcoal for fireplace fuel as well as for outdoor cooking. These woods could be impregnated with chemical solutions to provide colored flames or non-impregnated for use in place of charcoal to give a real smoke taste to grilled steaks.

(8) Home workshop material. Small woodworking machines in home workshops have become a national pastime. Packages of woods with different species and sizes in small quantities may suit the wants of woodworking hobbyists and homeowners. Small producers could procure woods from different sources in order to supply hobbyists' needs. Lumber yards, generally, do not provide such service.

It seems that vocational training in woodworking and promotion will help to establish wood cottage industries in rural areas. Agencies engaged in area development at the county level may be in the position to take the lead if such a need is visualized.

B. Forest Products Cooperatives

Ever since civilization began, people have found group action a necessity for safeguarding their common interests. The history of cooperatives presents a record of attacking problems of smallness in various fields, especially in agriculture. Integrated operation, diversification of business, standardization of product, and utilization of manufacturing wastes which are generally considered the privileges of large-scale enterprise can also be enjoyed by many small tree farmers if they organize as a cooperative unit.

Two common practices taken by various small forest owners have caused the rundown condition of many rural forest areas. First, they sold their tracts of timber to a portable mill operator who clear-cut it, thereby destroying all possibility of another timber crop for a generation or more. Second, they sold selected trees to buyers who would cut them and haul them to distant mills. This method skimmed all good-quality timber off the woodland and left undesirable species and poor quality woods to propagate and occupy the land. Both practices are destructive to the forest resources of a local community as well as to long-term income of individual owners.

Several forest products cooperatives were set up in the northern part of the country a decade ago, with small forest owners the principal members. The prime purpose of these cooperatives was to adopt a centralized management-and-utilization arrangement that would improve cutting practices and bring better returns to members. Foresters were hired for managing the cooperatives and sawmills were established to serve the local forest lands. All members were obliged to follow the rules and practices set up by the cooperatives. The basic cutting practices adopted by these cooperatives are listed below.[1/]

(1) Immature timber shall not be cut except for improving the spacing or composition of the forest.

(2) Stands that contain mature timber shall be cut selectively as far as practical.

(3) Clear-cuttings, where they are advisable, shall be small in area, and shall be made only when new growth is assured.

1/ Otsego Forest Products Cooperative Association of Cooperstown, New York, Agricultural Information Bulletin No. 17, U. S. Forest Service, Department of Agriculture, Washington, D. C., 1950.

(4) The amount cut shall be based on the annual growth, and after each cutting substantial regrowth shall be permitted to accrue before another cutting is made.

(5) Every tree to be cut--either for sale, fuel, or other purposes--shall be carefully selected and marked. The selection shall be based on improvement of the remaining stand.

The cooperative could accomplish many things which could not otherwise be possible under individual small owners. Improved timber quality and standardized product are the notable ones. Besides, a single administration of large tracts of forest land in a county is attractive to large-scale woodworking industries such as particle board, hardboard, insulation board and pulp, which must rely on an assured supply of wood resources.

Many diversified businesses and integrated operations with moderate capital requirements could be adopted by cooperatives if such opportunities arise. Cull trees, low-grade hardwoods, and wood residues can be used for making charcoal, wood pallets, fruit and vegetable containers, floor sweeping compounds, wood briquettes, handles, chicken coops, wood toys, etc.[1/] The recently developed sparse-toothed saw blades which make chips instead of sawdust could be adopted for sawmill use.[2/] Wood chips could sell to pulp mills for pulp material. Various other products could also be made by utilizing wood residues. Only through a centralized management such as a cooperative provides can small owners hope to realize an integrated operation.

A successful cooperative depends largely on sufficient business volume, proper management, sound finance, and true cooperative spirit in organization. There have, of course, been failures among cooperatives. On the other hand, many have succeeded by persistent struggle against difficult conditions. In any event, several precautions should be taken in order to determine the feasibility of such an organization on a county level. First, forest resources of a community should be determined in terms of location, volume, quality, rate of growth and drain, accessibility, ownership, and current utilization of the timber. Second, an estimate should be made of the number of potential

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1/ See "Charcoal Briquettes: A Manufacturing Opportunity in Georgia," by Robert E. Van Geuns, published by the Industrial Development Branch, Engineering Experiment Station, Georgia Institute of Technology, Atlanta 13, Georgia. An unpublished material of wood briquettes can also be obtained.

2/ For detailed information write to Forest Products Laboratory at Madison, Wisconsin.

members and the volume of business which could be handled. Third, possible types of business, facilities, equipments, and financing problems should be assessed. Fourth, the attitude and understanding of woodland owners toward cooperative organization should be cleared. If the results of this preliminary appraisal are favorable, steps toward organization of a cooperative can be taken. The Georgia Agricultural Extension Service, Athens, Georgia, will be in position for extending help to organize a cooperative.

Appendix

Possible Sites or Areas for Potential Wood-Using Industries in Georgia

Possible Pulpmill Sites

LaGrange, Montezuma, Fort Gaines, Hilton, Georgetown, Dublin, Madison, Milledgeville, Warrenton

Reasons for the chosen sites:

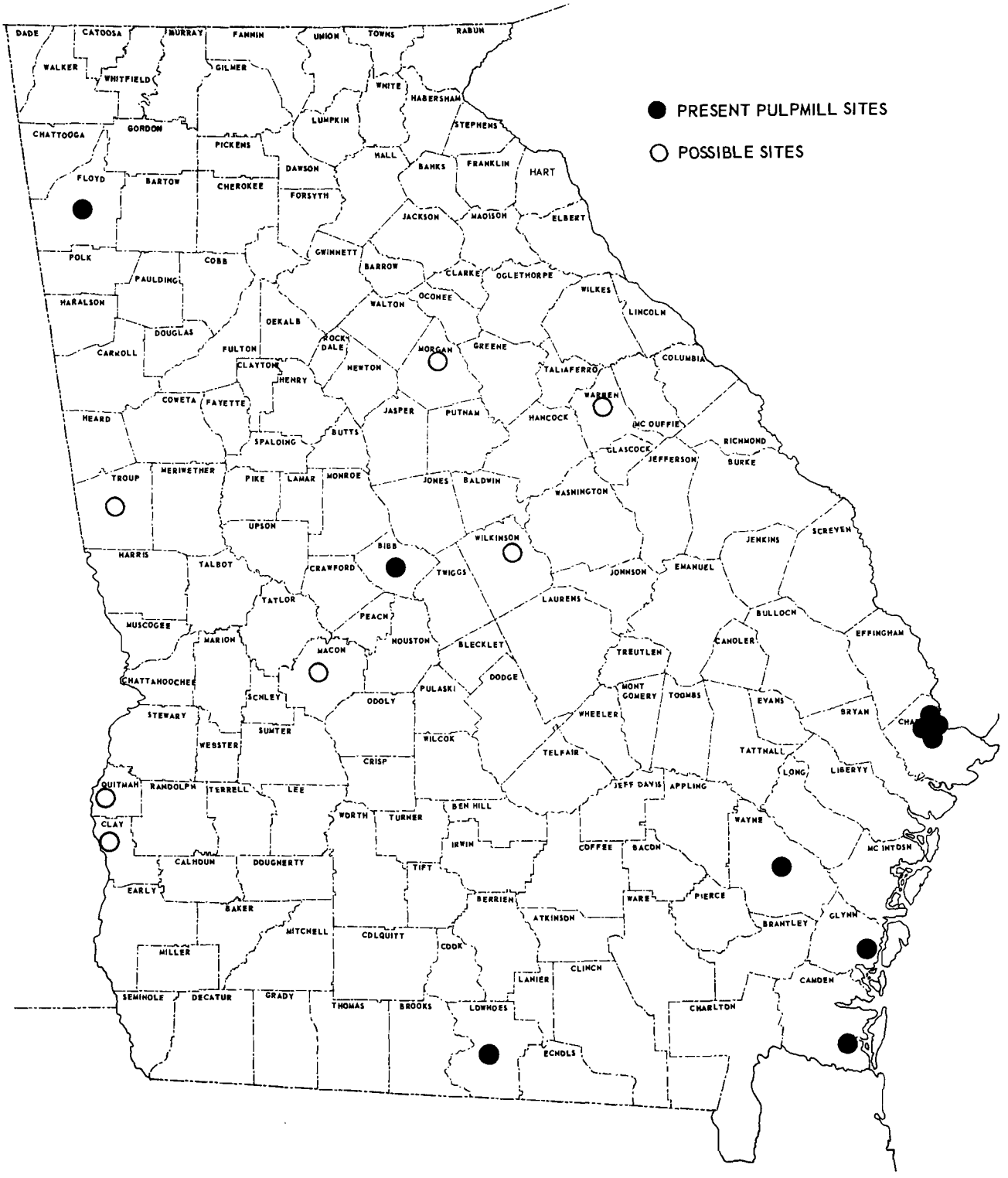
(1) Away from the present pulpmills

(2) Sufficient pulpwood growing stock around the sites

(3) The existing pulpmills own less forest lands in these areas than in the southeastern corner

(4) Close to water

MAP 6
PULPMILLS



Possible Furniture and Outdoor Furniture Plant Sites

Area I. Toccoa and Hiawassee

Wood resources: oak and hickory (large sawtimber)

Area II. Atlanta area

Wood resources: oak and hickory, also gum and yellow-poplar (large sawtimber)

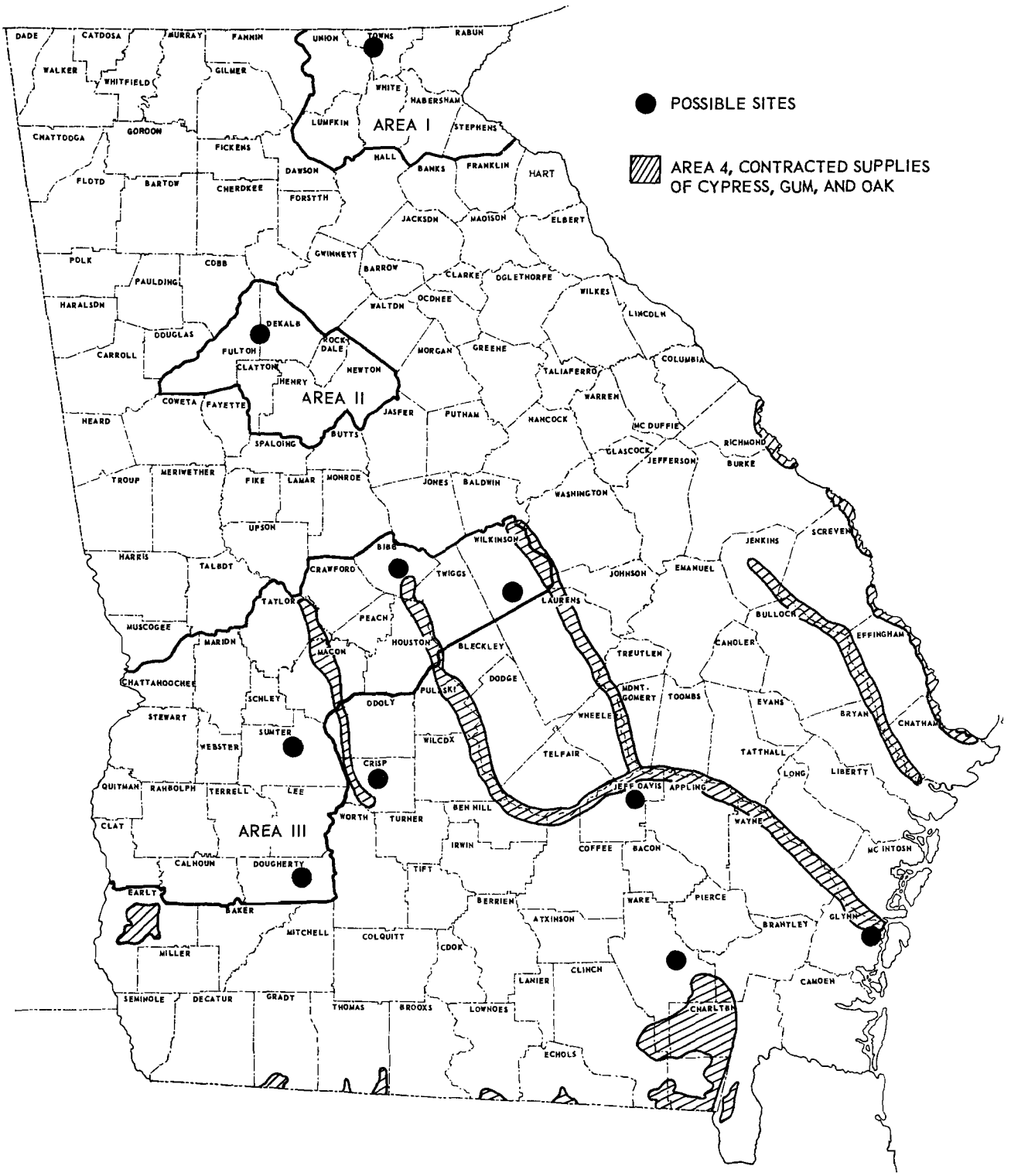
Area III. Macon, Dublin, Americus, Cordele, and Albany

Wood resources: oak and hickory mixed with gum and yellow-poplar (large and small sawtimber)

Area IV. (Shaded areas)
Savannah, Brunswick, Waycross, and Hazlehurst

Wood resources: cypress, gum, and oak

MAP 7
FURNITURE PLANTS



Possible Hardboard and Insulation Board Plant Sites

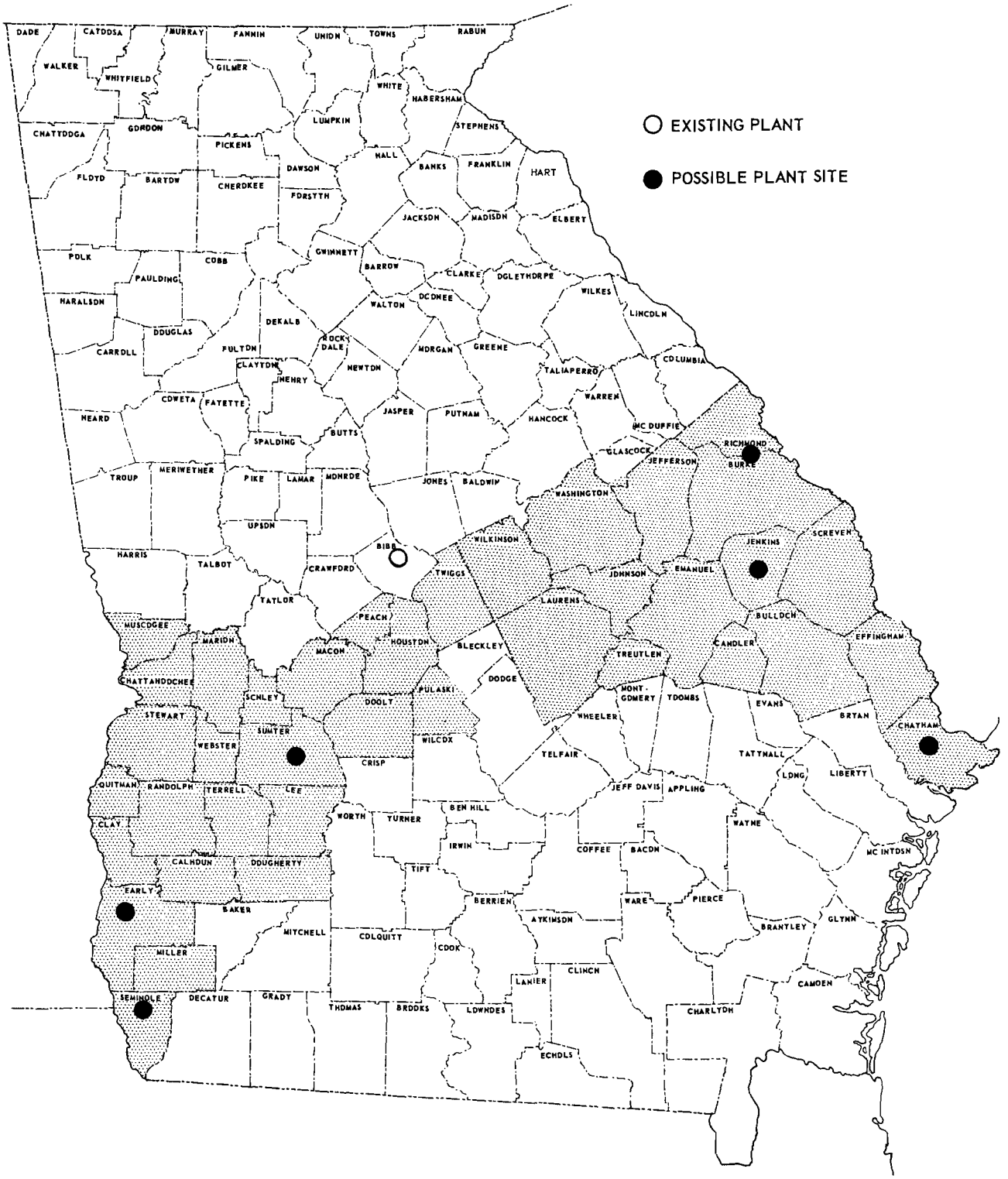
Americus, Augusta, Blakely, Donalsonville, and Savannah

Reason for the chosen sites:

(1) Soft hardwood areas

(2) Away from existing plants

MAP 8
HARDBOARD AND INSULATION BOARD



Possible Prefabricated-House Plant Sites

Atlanta, Columbus, and Valdosta

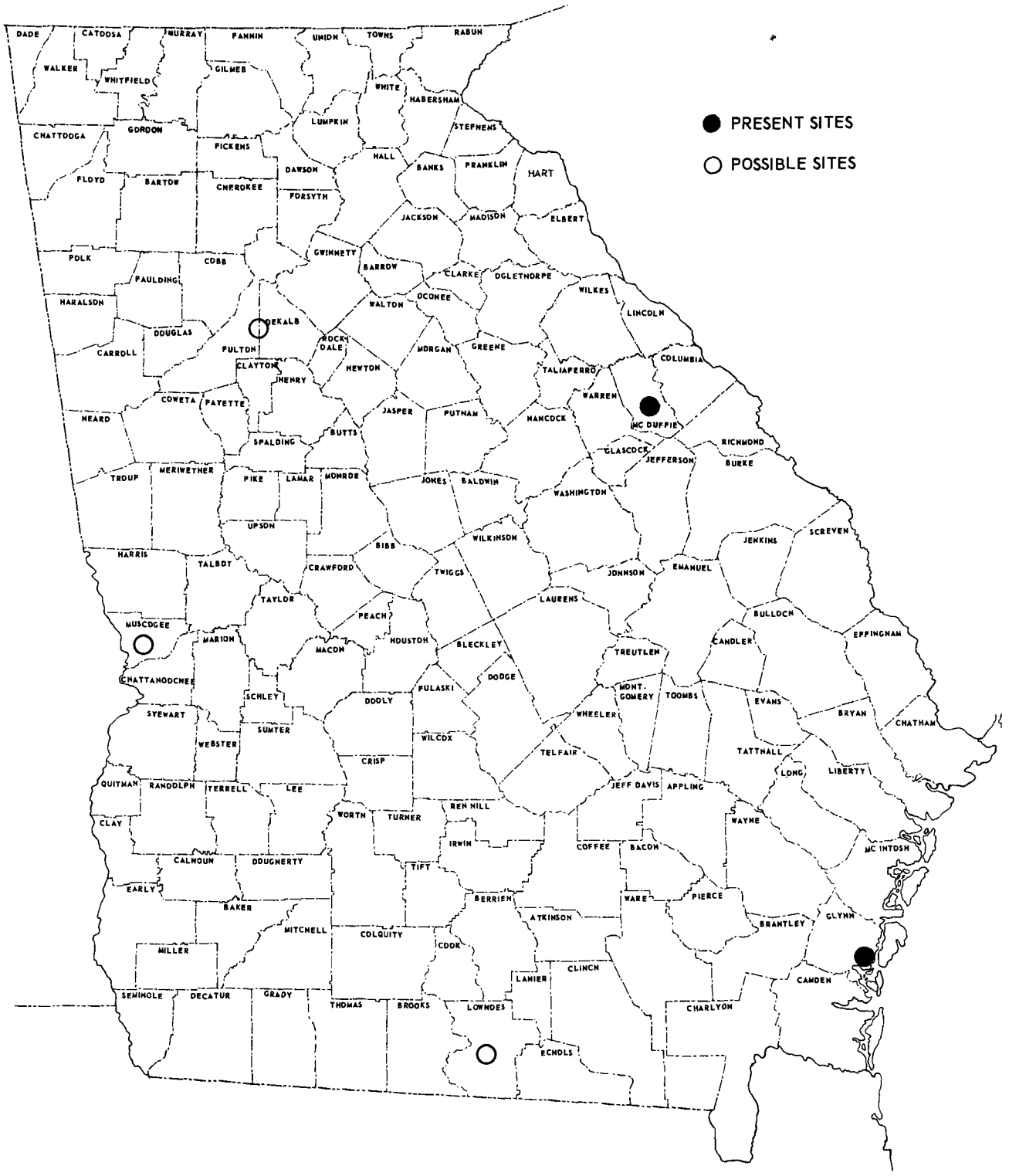
Reasons for the chosen sites:

(1) Metropolitan areas

(2) Dispersed throughout the state

(3) No competition in the immediate area

MAP 9
PREFABRICATED HOUSES



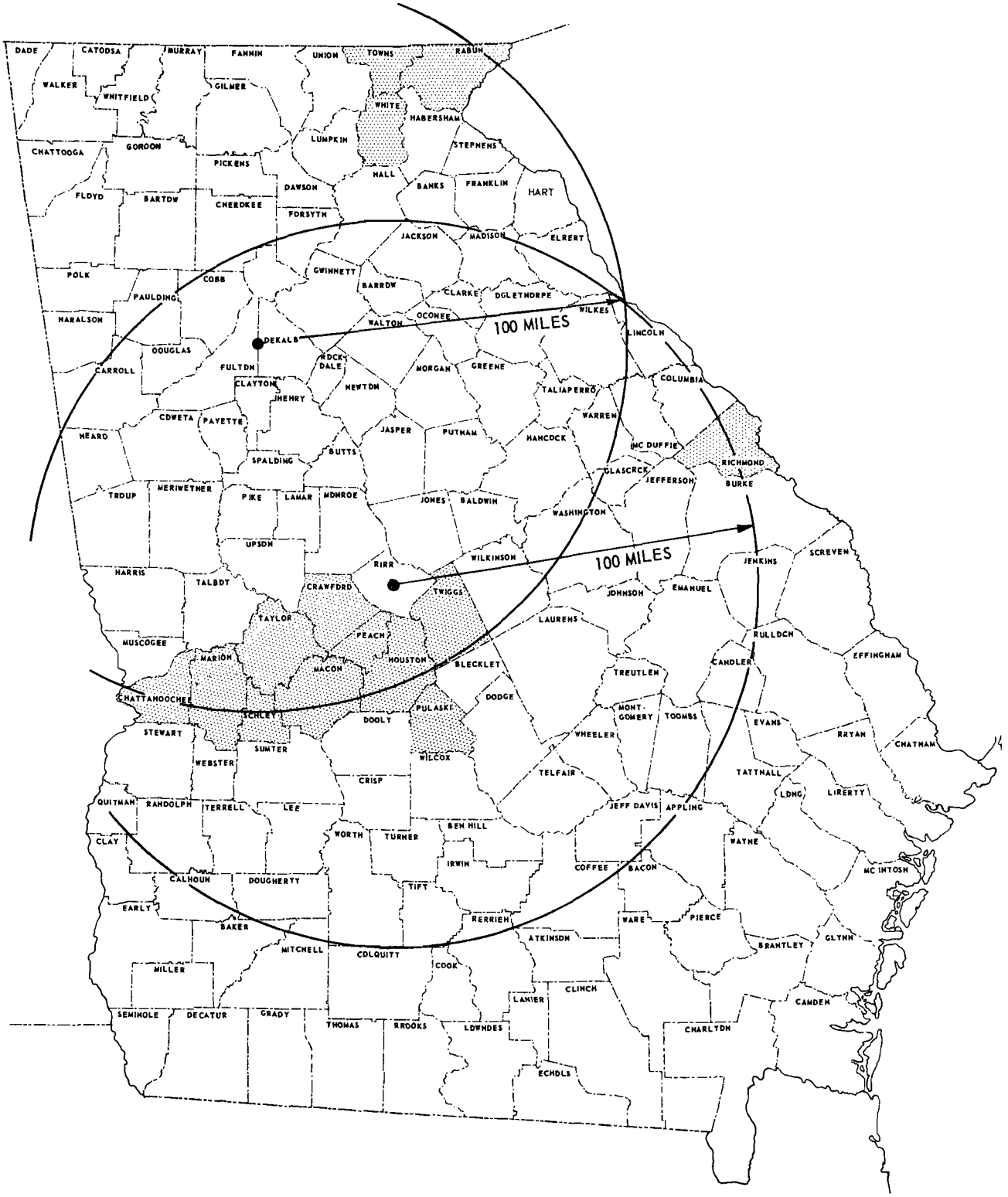
Possible Wood Pallet Plant Sites

A wood pallet plant might locate in the area of the principal markets--those large metropolitan centers excelling in manufacturing, warehousing, and transportation facilities, or it might locate near the major sources of hardwood supply. The three areas shown on the map represent the most concentrated sources of low-grade hardwood in the state.

A 100-mile radius from the vicinity of Macon would originate from the largest supply source and would at the same time encompass Augusta, Columbus, and Atlanta.

The ultimate location factor will be determined by the size of the operation, the amount of equipment used in the manufacture of other wood-based products, and the nature of the total product line. A manufacturer desiring to produce only pallets would probably find a location near the large manufacturing center of the state preferable.

MAP 10
WOOD PALLETS



Miscellaneous Wood Products

I. Oak-hickory area

Charcoal, handles, chairs and chair stock, step ladders, shuttles, wood novelties (toy furniture, book ends, games, Christmas tree stands, pipe racks, souvenirs, etc.).

II. Gum-yellow poplar area

Gum products: boxes and crates, chairs and chair stock, charcoal, cable reels, commercial refrigerator parts, wood novelties, etc.

Yellow-poplar products: agricultural implements (chutes, frames, wagon side, windmill sails, etc.), aircraft construction (structural parts such as spars, spar cap strips, web members of ribs, skin stiffeners, and longerons), fruit and vegetable baskets, small boats, cabinet works, caskets, excelsior, housing construction (exterior trim, siding, sheathings, general millwork), ladders, wood novelties, wood toys, etc.

MAP 11
MISCELLANEOUS WOOD PRODUCTS